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APPLICATION-N.º.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/630,883	08/02/2000	Khosrow Golshan	82259/156	7954
7590	03/17/2003		EXAMINER	
Alistair K Chan Foley & Lardner Firststar Center 777 East Wisconsin Avenue Milwaukee, WI 53202-5367			CHANG, AUDREY Y	
		ART UNIT	PAPER NUMBER	
		2872		
DATE MAILED: 03/17/2003				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/630,883	GOLSHAN, KHOSROW
Examiner	Art Unit	
Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 20 January 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1,4-11,13-15,17-31,33-36 and 38-46 is/are pending in the application.

4a) Of the above claim(s) 23-30 is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1,4-11,13-15,17-22,31,33-36 and 38-46 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____	6) <input type="checkbox"/> Other: _____

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on January 20, 2003, which has been entered as paper number 13.
- By this amendment, the applicant has amended claims 1, 4, 5, 11, 31 and 36.
- Claims 1, 4-11, 13-15, 17-22, 31, 34-36, and 38-46 remain pending in this application.
- Claims 23-30 *withdrawn* from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention group, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 4.
- The rejections to claims 1, 4-11, 13-15, 17-22, 31, 34-36 and 38-46 under 35 USC 112, first paragraph, set forth in the previous Office Action are *withdrawn* in response to applicant's amendment.
- The rejection to claims 1 and 4-10 under 35 USC 112, second paragraph, set forth in the previous Office Action is *withdrawn* in response to applicant's amendment.
- The objection to the drawings set forth in the previous Office Action **still holds**.

Response to Amendment

1. The amendment filed *January 20, 2003* is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **claims 1, 4, 5, 11, 31 and 36 have been amended** to include the following features that are not supported by the specification:

- (1) the optical input signal being "*modulated*",

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(2) the modulated optical input signal having the *same* wavelength and *phase* as the optical bias optical signal, and

(3) “the interference being based on the location of the first optical pathway with respect to the second optical pathway entering the interference region and length of the interference region and the location of the third optical pathway … the third optical pathway being the function of the wavelength and the length of the interference region and the distance between the first and second optical pathways”.

The specification simply fails to give support for any of these features.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1, 4-10, 11, 13-15, 17-22, 31, 33-35, 36, and 38-46 are rejected under 35 U.S.C. 112, first paragraph,** as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The reasons for rejection based on the *newly added matters* are set forth in the paragraph above. Claims 4-10, 13-15, 17-22, 33-35 and 38-46 inherit the rejection from their respective based claim.

4. **Claims 1, 4-10, 11, 13-15, 17-22, 36 and 38-46 are rejected under 35 U.S.C. 112, first paragraph,** as containing subject matter which was *not* described in the specification in such a way as to *enable* one skilled in the art to which it pertains, or with which it is most nearly connected, to make

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and/or use the invention. The specification fails to teach how could the bias optical signal and the modulated optical signal, (or between the two optical input signals as recited in claim 36) having the *same* wavelength and *phase* are capable of interfering with each other. It is known in the art that optical signals that are coherent to each other, namely with non-zero correlation with each other, are capable of interfering with each other. The coherency is realized by having definite phase difference between the two optical signals. The definite phase difference does not include the complete out-of-phase (phase difference equals 180 degrees) or in-phase (phase difference equals zero degree) situations in order to produce constructive-destructive interference patterns. The feature of having the modulated and bias optical signals with the same phase will make the two optical signals superpose to each other *in phase* and will **not** produce **interference pattern**. Claims 4-10, 13-15, 17-22, 33-35 and 38-46 inherit the rejection from their respective based claim.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. **Claims 1, 4-10, 11, 13-15, 17-22, 31, 33-35, 36 and 38-46 are rejected under 35 U.S.C. 112, second paragraph,** as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase “an interference region” recited in claim 1, is confusing and indefinite since it is not clear how does it relate to the interference region recited in the earlier part of the claim.

The phrases “the … optical pathways”, and “the third optical pathway” recited in claim 11, the phrases “the interference region” and the phrase “the third optical pathway” recited in claim 31 and the phrase “the third optical pathway” recited in claim 36 are indefinite since they each lacks proper antecedent basis from earlier part of the claims.

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The phase “in an always on condition” recited in claim 31 is indefinite since it is not clear what does it means by “always on”.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1, 4-10, 11, 13-15, 17-22, 36 and 38-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Utaka et al in view of the patent issued to Yang.**

The reasons for rejection are set forth in the previous Office Action dated October 22, 2002.

Claims 1 has been amended to include the feature that the optical input signal is *modulated*. However the specification fails to disclose such feature and fails to disclose what does it mean by “modulated”. Utaka et al teaches that the optical signal may be modulated by having phase modulating elements placed in the optical path of the input signal to make it modulated input signal, (please see Figure 4, column 5, lines 60-69).

Claim 1 also has been amended to have a third optical pathway configured to provide the pathway for the optical output signal. Both Utaka et al and Yang references teach that a third optical pathway is provided for the output optical signal, (please see all the figures of Utaka et al and the element such as 42 in Figure 5 of Yang).

Claims 1, 11, and 36 have been amended that the input optical signals and/or bias optical signal are having the same wavelength and the same phase. Both Utaka et al and Yang references teach that the input and/or bias optical signals are of the same wavelength because they are generated by the same light source. The feature concerning the phase being the same is believed to be in error since if they are having

the same phase no interference between them will be resulted and the optical logic circuit cannot be operable, since interference phenomenon is the essential feature in the logic circuit design. This feature therefore cannot be further addressed.

Claims 1, 11 and 36 have been amended to include the feature that the interference is based on the positions of the locations of the input optical pathway and the location of the output pathway and the length of the interference region. Also the location of the output optical pathway is a function of the wavelength, the length of the interference region and the distance between the first and second input optical pathways. It is *noted* that the specification does not give any teachings or support to these features claimed, (please see the new matters rejections above). These features however are the fundamental factors for the interference effect between two optical signals as demonstrated by the teachings of Yang in Figures 1-6). Yang teaches explicitly that the interference pattern between the two input optical signals, (from slits 13 and 14, Figures 1 and 4), is determined by the locations and distance separation between the two optical pathways (or slits) for conducting the two signals into the interference chamber (17, Figure 1). The wavelength of the two optical signals and the length of the interference chamber also are the factors for determining the interference pattern as shown in Figure 1 and the cited equations in column 3. The angle θ is known in the art to be approximated by the ratio between the measurement between the point on the opposite wall of the interference region with respect to the normal between the two input optical pathways and the length of the interference region L. Yang teaches explicitly that different types of the logic calculation are determined by the interference pattern, (please see column 3).

9. **Claims 31 and 33-35 rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Yang in view of the patent issued to Utaka et al.**

The reasons for rejection are set forth in the previous Office Action dated October 22, 2002.

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Claim 31 has been amended to include the feature that the input signal is a bias signal and is always on. Yang does not teach explicitly that one of the input signals is a bias optical signal, however either one of the input optical signal can be identified as the bias optical signal since the specification only defines it to be a light signal that is capable of interfering with the input optical signal. Yang teaches that the input optical signals are generated by a *coherent* light source, which means the two input optical signals are light signals and are capable of interfering with each other and they are always on as long as the binary data processor is in use.

Claim 31 has been amended to include the feature that the interference is based on the positions of the locations of the input optical pathway and the location of the output pathway and the length of the interference region. Also the location of the output optical pathway is a function of the wavelength, the length of the interference region and the distance between the first and second input optical pathways. It is noted that the specification does not give any teachings or support to these features claimed, (please see the new matters rejections above). These features however are the fundamental factors in determining the interference effect between two optical signals as demonstrated by the teachings of Yang in Figures 1-6). Yang teaches *explicitly* that the interference pattern between the two input optical signals, (from slits 13 and 14, Figures 1 and 4), is determined by the locations and distance separation between the two optical pathways (such as the slits) for conducting the two signals into the interference chamber (17, Figure 1). The wavelength of the two optical signals and the length of the interference chamber also are the factors for determining the interference pattern as shown in Figure 1 and the cited equations in column 3. The angle θ is known in the art to be approximated by the ratio between the measurement between the point on the opposite wall of the interference region with respect to the normal between the two input optical pathways and the length of the interference region L. Yang teaches explicitly that different types of the logic calculation may be determined by the interference pattern, (please see column 3).

Response to Arguments

10. Applicant's arguments filed January 20, 2003, have been fully considered and they are not persuasive to overcome the rejections. The newly amended claims have been fully considered and they are rejected for the reasons stated above.

11. Applicant's arguments are mainly drawn to the amended features of the claims and they have been fully addressed in the paragraphs above.

12. In response to applicant's arguments concerning the drawings objection, the applicant is respectfully reminded that the claimed features, such as the *optical layer* over the substrate layer *having the plurality of optical pathways and the interference region* must be shown. Figure 8 only shows the different layers but *fails* to show the optical pathways and interference region in the optical layers. All the other figures fail to show the layer structure.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A. Chang, Ph.D.
March 14, 2003

*Audrey Y. Chang
Primary Examiner
Art Unit 2872*